ZHUK, Konstantin Danilovich

Determination of the coefficients of transfer functions of linearized links of automatic control systems using a relaxation method. Izv. vys. ucheb. zav.; elektromekh. 6 no.9:1062-1070 '63.
(MIRA 16:12)

1. Starshiy inzhener bazovoy laboratorii elektronnogo modelirovaniya kafedry elektricheskikh apparatov Khar'kovskogo politekhnicheskogo instituta.

Card   1/2

ASSOCIATION: None

Card 1/2

ASSOCIATION: None

L 13650-66   EWT(d)/EWP(v)/EWP(k)/EWP(h)/EWP(1)

ACC NR: AP6001205   SOURCE CODE: UR/0378/65/000/005/0103/0103

AUTHOR: Zhuk, K. D. (Candidate of technical sciences; Senior research associate)

ORG: Institute of Cybernetics, AN UkrSSR (Institut kibernetiki AN UkrSSR)

TITLE: International conference on many-dimensional and discrete automatic control systems

SOURCE: Kibernetika, no. 5, 1965, 103

TOPIC TAGS: automatic control system, computer control system, computer application, mechanical engineering conference, automatic control, digital computer, analog computer, automatic control theory, optimal automatic control

ABSTRACT: The International Conference on Many-Dimensional and Discrete Automatic Control Systems held in Prague, Czechoslovakia, 9-12 June, 1965, was attended by scientists and engineers from the following academies of sciences of the socialistic countries: Czechoslovak, Slovak, USSR, Ukrainian, Hungarian, Bulgarian, East German, Polish, and Rumanian. The organizing committee was headed by a well-known Czechoslovak scientist, Doctor of Engineering Sciences V. Strejc (Institute of Information and Automation, Czechoslovak Academy of Sciences). The survey papers by the scientific secretary of the Czechoslovak Academy of Sciences, Corresponding Member of this academy, I. Pluhar entitled "Progress

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ACC NR: AP6001205

in the fields of many-dimensional and discrete control systems" and by Doctor of Engineering Sciences V. Strejc entitled "Many-dimensional and discrete control systems" were presented at the plenary session. V. Strejc indicated in his paper that qualitative control of many-dimensional systems is possible only by utilizing control computers (analog and digital); therefore, it is self-evident why the conference program stressed these two trends which at first glance look so distinct. Over fifty papers were presented in three sections: a) synthesis of many-dimensional automatic control systems, b) discrete automatic control systems and systems with a variable structure, and c) optimization, special computing devices, and their application. Each section was subdivided into a certain number of subsections which covered the related papers. Section one contained the following subsections; 1) synthesis of many-dimensional systems (authors of articles F. Csaki (HPR), I. Sponer (GDR), and L. Pogoda (PPR)); 2) synthesis of many-dimensional discrete systems (A. Halouskova (CSSR), F. György (HPR), Z. Bubnieki (PPR)); 3) special problems of the theory of many-dimensional automatic control systems (A. Straszak (PPR), I. Ratz (HPR), and V. Pavlov (UkrSSR)); 4) stability problems in many-dimensional automatic control systems (O. Polusinski (PPR), G. Pukhov, K. Zhuk (UkrSSR), P. Chinayev (UkrSSR), M. Meyerov (USSR), A. Kukhtenko (UkrSSR), V. Utkin (USSR), and P. Brunovsky (CSSR)).

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ACC NR: AP6001205

3 9

Section two contained the following subsections: 1) theory of discrete automatic control systems (B. Hanuš (CSSR), V. Vurcfeld (CSSR), K. Vavra (CSSR), and W. Uhlig (GDR)); 2) theory of automatic control systems with variable structures and automatic control systems with pulse-width modulation (S. Emelyanov, M. Giritsenko (USSR), Šindelař (CSSR), G. Schulz (GDR), Ye. Dudin, G. Ulanov (USSR)); 3) realization of discrete devices and systems (T. Aleksandridi (USSR), T. I. Matyáš (CSSR)); 4) synthesis of discrete automatic control systems (K. Reinisch. (GDR), Ye. Krug (USSR), J. Vajs (CSSR), S. Bláha (CSSR); 5) special problems in the theory of discrete systems (Ya. Tsypkln (USSR), M. Guenther (GDR), P. Kovanic (CSSR). Section three contained the following subsections: 1) optimization (M. Orbán (HPR), F. Milkiewicz(PPR), S. Petraš (CSSR), N. Stanulov (BPR), B. Frankovic, R. Koňakovsky (CSSR), F. Dráb (CSSR)); 2) digital devices: (A. Luchuk, L. Zhuk (UkrSSR), A. Ormicki (PPR), B. Malinovskiy (UkrSSR), A. Orlicki, P. Lazewski (PPR), P. Valášek (CSSR)); 3) application of digital computers for controlling technological processes (A. Bukovi (PPR), V. Vítek, R. Rainis, V. Maletinsky (CSSR), J. Ibler (CSSR), and J. Solden (PPR)). The existing trends and subsequent development of the theory of many-dimensional and discrete control systems were more clearly formulated and new problems were posed which have to be solved in the near future. [ATD PRESS: 4173-F]

SUB CODE: 13, 09 / SUBM DATE: none

Card 3/3 jw

L. 0771b-67   EWT(d)/EWT(v)/EWT(k)/EWT(h)/EWP(1)

ACC NR: AP6034638   SOURCE CODE: UR/0102/06/000/004/0008/0017

23

AUTHOR: Zhuk, K. D. (Kiev)

ORG: none

TITLE: Structural equavalence of invariant and optimal multiply connected control systems in problems of synthesis

SOURCE: Avtomatyka, no. 4, 1966, 8-17

TOPIC TAGS: control system, invariant control system, linear automatic control, dynamic system, mean square error

ABSTRACT: The author analyzed the problem of synthesis of linear multivariant control systems in statistical dynamics. It is shown that the determination of design of multivariant systems, synthesized according to the invariance conditions, satisfies at the same time the optimal conditions for the minimum mean square error. Taking into consideration the results of an analysis of the structure investigated, the author concludes that the optimal multivariant system must generally belong to the nonautonomous control systems. The problem of synthesis

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L 09914-67

ACC NR: AP6034638

is solved by the method of factorization of spectral matrixes. In accordance with the results of factorization, the design of the control device of a multivariant system is determined from the conditions of physical practicability with the aid of signal graphs of the multivariable system. The problem of synthesis for two types of multivariant control systems is investigated in a general form. In the first case, disturbances in the form of noise enter the input of the closed loop system together with the desired signals. The solution of the synthesis problem obtained in an explicit form coincides with the solution of the problem of synthesis of the optimal multipole filter. In the second and more general case, the disturbances are applied directly to the multivariant object controlled in a closed loop system. The solution of the synthesis problem is obtained implicitly for the operators of the synthesized control devices. Orig. art. has: 4 figures and 28 formulas. [Based on author's abstract]

SUB CODE: 12, 13/SUBM DATE: 06Apr65/ORIG REF: 010/OTH REF: 004/

ACC NR: AT6029237   SOURCE CODE: UR/0000/66/000/000/0246/0251

AUTHOR: Zhuk, K. D.

ORG: none

TITLE: Multivariable system control by simulators synthesized by the method of inverse operators

SOURCE: Vsesoyuznaya konferentsiya-seminar po teorii i metodam matematicheskogo modelirovaniya. 4th, Kiev, 1964. Vychislitel'naya tekhnika v upravlenii (Computer technology in control engineering); trudy konferentsii. Moscow, Izd-vo Nauka, 1966, 246-251

TOPIC TAGS: adaptive control, self adaptive control

ABSTRACT: The method consists of replacing the correcting cross-over feedback of the system in Fig. 1 by the inverse model of the object (Fig. 2); the synthesis of the model is reduced to a determination of the inverse operators of the main loops

$$\tilde{W}_{ii}^{-1}(D, t)$$

from the known direct operators

$$W_{ii}(D, t).$$

More than ten multivariable systems were examined; all of them had quite adequate pro-

Card 1/3

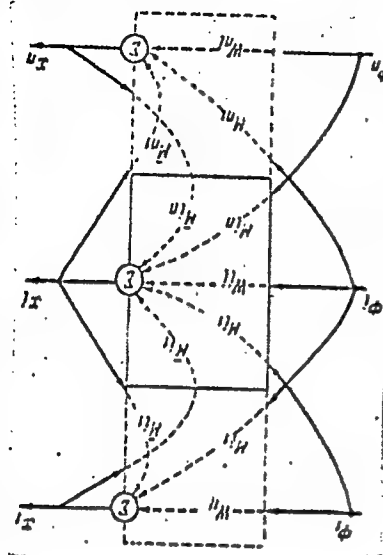ACC NR: AT6029237

Fig. 1. Block diagram of the i-th channel of a multivariable system, where $\underline{\Phi(t)} = [\Phi_1(t), \Phi_2(t), \ldots, \Phi_n(t)]$ is the set of input variables.
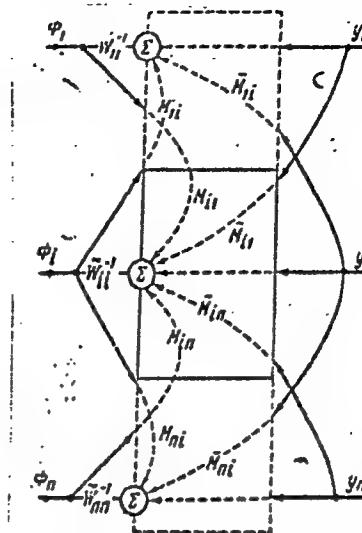

Fig. 2. Block diagram of the inverse model.

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ACC NR: AT6029237

perties and were sufficiently fast. Systems of matrix equations were constructed for the object and for the inverse model, respectively. The design of invariant multivariable systems requires the complete availability of information on the excitation impulses that act upon each circuit; these excitations must be determined in quantities that are both measurable and transformable. Orig. art. has: 7 figures, 9 formulas.

SUB CODE: 09,12/   SUBM DATE: 12Feb66/   ORIG REF: 008/   OTH REF: 003

Card 3/3

ACC NR: AM6029766   Monograph   UR/

Pukhov, Georgiy Yevgen'yevich; Zhuk, Konstantin Danilovich

Application of the inverse operator method in the synthesis of multivariable control
systems (Sintez mnogosvyaznykh sistem upravleniya po metodu obratnykh operatorov)
Kiev, Naukova dumka, 1966. 217 p. illus., biblio. (At head of title: AN UkrSSR.
Institut kibernetiki) 4000 copies printed.

TOPIC TAGS: automatic control theory, automatic control design, control system
stability, multivariable automatic control, multivariable control synthesis, in-
verse operator method

PURPOSE AND COVERAGE: This book presents the basic principles of designing multi-
variable automatic control systems and the solution of the synthesis problem for
such systems utilizing the method of inverse operators which have lately occu-
pied a prominent place in the theory of computing systems, applied problems of
communication theory, and the theory and application of automatic control systems.
The book contains recent original results obtained by the authors.

TABLE OF CONTENTS [Abridged]:

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ACC NR: AM6029766

Ch. II.   Reversible and quasi-reversible models -- 21
Ch. III. Properties of multivariable systems with reversible control models -- 30
Ch. IV.   Autonomy in control systems with many controlled variables -- 58
Ch. V.   Invariance in multivariable systems with control models -- 98
Ch. VI.   The design of multidimensional servosystems by the method of inverse operators -- 146
Ch. VII. The design of autonomous systems with multivariable compensators for controlling plants with time delay -- 169
Ch. VIII. Structures of multivariable systems for controlling plants on the basis of functional relationships of the variables -- 189
Ch. IX.   Realization of the principle of self-adaptivity and the control of certain multivariable systems in game situations -- 201

Bibliography -- 216

SUB CODE: 12,09/   SUBM DATE: 22Feb66/   SOV REF: 080/   OTH REF: 011/

Card   2/2

ZHUK, L.A.; MALINOVSKIY, B.N., kand.tekhn.nauk

Design of multichannel electronic switching circuits.   Avtom. i prib.
no.1:40-45 Ja-Mr '63.   (MIRA 16:3)

1. Institut kibernetiki AN UkrSSR.
                        (Electronic circuits)

PASICH, E.F.; ZHUK, L.N.

The MP74M automatic vertical broaching machine. Biul.tekh.-ekon.
inform.Gos.nauch.-issl.inst.nauch.i tekh.inform. no.12:43-45 '63.
(MIRA 17:3)

ZHUK, L. N. (Sevastopol')

Reaction to C-reactive protein in acute dysentery. Vrach. delo
no.7:97-99 Jl '62.   (MIRA 15:7)

1. Kafedra mikrobiologii (nachal'nik - prof. A. A. Sinitskiy)
Voyenno-meditsinskoy ordena Lenina akademii imeni S. M. Kirova
i Voyenno-morskoy infektsionnyy gospital' Chernomorskogo flota.

(PROTEINS) (DYSENTERY)

ZHUK, M.

Effective work of a women's committee. Rab. i sial. 39 no.3:22
Mr '63.
                                                    (MIRA 16:4)

(Zhitkovichi District—Women—Societies and clubs)

ZHUK, M.

29019

Niekochastotnyy Iemye-ritel'nyy Komplyekt. (Ie Eksponatov 8-y Eaoch. Radiovystavki).
Radio, 1949, No 9, C. 52-55

SO: LETOPIS'No. 34

ZHUK, N.P.

Mechanism of the gaseous corrosion of steel. Zhur.fiz.khim.30 no.5:
1173-1176 My '56.   (MIRA 9:9)

1.Institut stali imeni I.V.Stalina, Moskva.
        (Steel--Corrosion)

ZHUK-KOGAN, N.

Skin - Diseases

Abstracts. Vest. ven. i derm. no. 4, 1952.

ZHUK-KOGAN, N.

VENEREAL DISEASES

Abstracts.   Vest. ven. i derm. no. 4, 1952

Monthly List of Russian Accessions Library of Congress November 1952   UNCLASSIFIED

USSR/Electricity   Oct 48
      Voltmeters

"A Cathode Voltmeter," M. Zhuk, 1 3/4 pp

"Radio" No 10

Describes VK-2 cathode voltmeter, giving circuit
diagram. It can measure constant voltages
0.1-1,000 volts, low-frequency alternating volt-
age 0.2-1,000 volts, and resistances 0.20 ohm-
500 megohms.

IC   22/49T27

ZHUK, M.

Creativeness of Soviet radio amateurs. Voen.znan. 25 no.6:6
Je '59.
     (Radio--Exhibitions)   (MIRA 12:12)

ZHUK, M.

20704. Zhuk, M. Pervyy supergeterodin lyubitelya. Radio, 1949, No. 6, s. 54-55

SO: LETOPIS ZHURNAL STATEY - Vol. 28, Moskva, 1949

ZHUK, M.

Oct 48

USSR/Electricity
     Voltmeters

"A Cathode Voltmeter," M. Zhuk, 1 3/4 pp

"Radio" No 10

Describes VK-2 cathode voltmeter, giving circuit
diagram. It can measure constant voltages
0.1-1,000 volts, low-frequency alternating volt-
age 0.2-1,000 volts, and resistances 0.20 ohm-
500 megohms.

22/49T27

LC

ZHUK, M.

USSR/Radio - Oscillators, High-Frequency   Nov 49
              Oscillographs

"Oscillograph Attachments," M. Zhuk, 2 pp

"Radio" No 11

Describes two exhibits at Eighth Corr Radio Exhi-
bition: (1) two-tube FM oscillator, and (2)
electronic switch, both intended for use with
oscilloscopes to simplify circuit analysis.
Includes three diagrams and two photographs.

153T102

FDD

ZHUK, M.

USSR/Radio Receivers, Superheterodyne   Apr 49
     Vacuum Tubes

"The 'Rodina-47' Receiver," M. Zhuk, 4 pp

"Radio" No 4

"Rodina-47" receiver, also called the "Elektrosignal-3," is a battery-power superheterodyne which uses 2-volt miniature tubes. It receives on the following bands: 150 - 410 kc, 520 - 1,500 kc, and 4,300 - 12,000 kc, using an intermediate frequency of 460 kc.

42/49T98

FDB

ZHUK, M.

USSR/Radio - Test Equipment   Sep 49
              Oscillators, Audio

"An Audio Frequency Test Set (Audio Oscillator,
Cathode-Ray Oscillograph, and Vacuum-Tube Volt-
meter)," M. Zhuk, 4 pp

"Radio" No 9

The set devised by M. Ts. Stolov was awarded
second prize in the test equipment division at
the Eighth All-Union Corr Radio Exhibit.

FDD   1/50T90

ZHUK, M. [S.]

29019 Nizkochastotnyy izmeritel'nyy komplekt. (Iz eksponatov 8-y zaoch.
radiovystavki). Radio, 1949, No 9, S. 52-55

SO: Letopsi' Zhurnal'nykh Statey, Vol. 39, MosKva, 1949

ZHUK, M. (Riga)

In the Riga Electrotechnical Plant. Pozh.delo 8 no.1:29 Ja
'62.   (MIRA 15:1)

(Riga--Factories--Fires and fire prevention)

ZHUK, M. [S.]

36098 Pristavki K ostsillografu. (Iz edsponatov 8-y zaochnoy radiovystavki). Radio, 1949, No. 11, S. 54-55

SO: Letopis' Zhurnal' nykh Statey, No. 49, 1949

BENUNI, A. Kh.; YEL'BISINOV, S. Kh.; ZHUK, M. G.

Use of electron computer techniques for technical and economic
calculations in nonferrous metallurgy. TSvet. met. 35 no.10:4-8
O '62.   (MIRA 15:10)

(Electronic calculating machines)
(Nonferrous metal industries)

ZHUK, M. M., MASTYKO, G. S. and BAGRINOVSKAYA, YE. M.

"Intravenous injection of novocaine in the case of recurrent eye inflammation in horses."

Veterinariya, Vol. 37, No. 10, 1960, p. 53

Zhuk - assistant, Vitebsk Vet Inst.

MASTYKO, G.S., dotsent; BAGRINOVSKAYA, Ye.M., assistant; ZHUK, M.M., assistant

Intravenous administration of novocaine during periodical eye inflammation in horses. Veterinariia 37 no.10:53-54 O '60.
(MIRA 15:4)

1. Vitebskiy veterinarnyy institut.
(Horses--Diseases and pests) (Eye--Inflammation)
(Novocaine--Therapeutic use)

MASTYKO, G. S. (Docent) and ZHUK, M. M. (Assistant, Vitebsk Veterinary Institute).

"Surface novocain skin blockade in conjunction with biomycin..."
Veterinariya, vol. 39, no. 2, February 1962 pp. 60

ZHUK, M. S.

The electrodynamic loud speaker. Moskva, Gos. energ. izd-vo, 1950. 39 p. Massovaia radiobiblioteka, vyp. 65. (51-22776).

TK6563.Z5

ZHUK, M. S. and BEKTABEGOV, A. K.

Rekorder Dlia Eapici Na Disk (Phonograph Disc Recording), 21 p., Moscow and Leningrad, 1951.

ZHUK, M. S.

"Crystal Apparatus," Radio, 20, No. 3, 1947;

"A Cathode Voltmeter," ibid., No. 10, 1948;

"How A Loudspeaker Works," ibid., No. 3, 1949;

"The 'Rodina-47' Receiver," ibid., No. 4, 1949;

"A First Superheterodyne for Amateurs," ibid., No. 6, 1949;

"An Audio Frequency Test Set (Audio Oscillator, Cathode-Ray Oscillograph, and

Vacuum-Tube Volt-meter)," ibid., No. 9, 1949;

"Oscillograph Attachments," ibid., No. 11, 1949.

ZHUK, M. S.

Elektrodinamicheskii gromkogovoritel'. [Electro-dynamic loudspeaker]. Moskva, Gos. energ. izd-vo, 1950. 39 p. diagrs. (Massovaia radiobiblioteka, vyp. 65).

DLC: TK6563.Z5

SO: Soviet Transportation and Communications, A Bibliography, Library of Congress, Reference Department, Washington, 1952, Unclassified.

ZHUK, NINA

Markovich, Mariia Aleksandrovna (Velinskaia) 1834-1907

Marko Vovchok, for the 45th anniversary of her death.
Rad. zhin 7, No. 8, 1952

ZHUK,N., kandidat khimicheskikh nauk

Electricity and chemistry. Znan.sila no.9:24-28 S'55. (MIRA 8:12)
(Electrochemistry)

ZHUK,NINA

Authors, Ukrainian

Marko Vovchok; for the 45th anniversary of her death. Rad. zhin. 7 no. 8, 1952

9. Monthly List of Russian Accessions, Library of Congress, ___June___ 1953. Unclassified.

19

CA

PROCESSES AND PROPERTIES INDEX

Using urtite in glass making. V. V. VARGIN AND N. B. ZHUK. *Keram. Steklo* 3, No. 8, 6-9 (1932).—Urtite contains 85% nephelite, 5% apatite, and 10% dark colored minerals; and it is obtained in large quantities in the working of apatite deposits of the Mourman (North Russia). The alkali content is 17-21%, whereas nephelite syenite contains only 11-15%. The ratio of the alumina to the alkali content averages about 1.43 in urtite (nephelite syenite, 1.60). Two series of 9 exptl. melts each and having a compn. as similar as possible to that of industrial nephelite glasses were made. It was found that urtite glasses melt more rapidly than nephelite, the glass is less viscous and is refined more easily, and that urtite dissolves in the melt better than nephelite; also, that urtite glasses tend to devitrify much less.

M. V. KONDORDY

A 8 8 - S L A   METALLURGICAL LITERATURE CLASSIFICATION

DYKHNE, F.; ZHUK, N.

For more accurate methods in determining the moisture of corn.
Muk.-elev. prom. 27 no.7:10-11 Jl '61.   (MIRA 14:7)

1. Goskhlebinspektsiya Ministerstva zagotovok Ukrainskoy SSR.
                    (Corn (Maize))--Drying)

SIRENKO, A.; ZHUK, N., starshiy inzh.

Determining weed content of grain by the standard sample method.
Muk.-elev. prom. 27 no.10:21-22 O '61.   (MIRA 14:12)

1. Gosudarstvennaya khlebnaya inspektsiya Ministerstva
zagotovok USSR. 2. Starshiy inspektor Gosudarstvennoy
khlebnoy inspektsii Ministerstva zagotovok USSR (for Sirenko).
                (Grain—Analysis)

Using uritite in glass making. VV Vargin and
MB Zhuk (Keram i Steklo. 1932, 8, no. 8,6-9). Uriite
(Nephelite 85, apatite 5, dark coloured minerals 10%: alkali
17,21%: Al_2O_3 1.43) from Murman gives glasses which melt
more rapidly devitrify less readly are less viscous and more
easily refined than nephelite glasses.

ZHUK, N. D.; TOMASHOV, N. D. (Prof., Dr. Chem. Sci.); MIROLYUBOV, E. N. (Engr.)

"An investigation of the Inactivity of Iron in Oxidizer Solution,"
in book The Application of Radioisotopes in Metallurgy, Symposium XXXIV, Moscow;
State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

Prof. N. D. Tomashov, Dr. Chem. Sci.; E. N. Mirolyubov, Engr.; N. D. Zhuk, Assistant,
Chair of Metal Corrosion, Moscow Inst. of Steel im I. V. Stalin.

KRAMINSKAYA, N.N. (g Ussuriysk); ESKIN, V.A. (g.Ussuriysk); ZHUK, N.F.
(g.Ussuriysk)

Etiology of periodic ophthalmia in horses. Veterinariia 36
no.12:13-17 D '59.   (MIRA 13:3)
(Horses—Diseases)

ZHUK, N.K., mayor meditsinskoy sluzhby; SHUMAYEVA, V.F.

Metabolism of water-soluble vitamins under conditions of a hot climate.
Voen.-med.zhur. no.7:45-48 '64.   (MIRA 18:5)

ZHUK, N. M.

PA 17/49T23

USSR/Electricity
    Arcs
    Electrodes

Jul 48

"Vibrating Cutoff Arc," N. M. Zhuk, Odessa Astr
Obs, 1¼ pp

"Zavod Lab" Vol XIV, No 7

Cutoff arcs, i.e., AC arcs in which the electrodes
touch periodically, are used in many factory
spectrum appliances. Describes model where arcs
are brought together by an electromagnet instead of
an electric motor.

17/49T23

ZHUK N.P.

5(5)
Soveshchaniye po elektrokhimii. 4th, Moscow, 1956.

PHASE I BOOK EXPLOITATION   SOV/2216

Trudy...[sbornik] (Transactions of the Fourth Conference on Electrochemistry; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 868 p. Errata slip inserted. 2,500 copies printed.
Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk.

Editorial Board: A.N. Frumkin (Resp. Ed.) Academician, O.A. Yesin, Professor; S.I. Zhdanov (Resp. Secretary), B.N. Kabanov, Professor, Professor; S.I. Zhdanov (Resp. Secretary); B.N. Kabanov, Professor, Ya. M. Kolotyrkin, Doctor of Chemical Sciences; V.V. Losev, P.D, Lukovtsev, Professor; Z.A. Solov'yeva; V.V. Stender, Professor; and O.N. Florianovich; Ed. of Publishing House: M.G. Yegorov; Tech. Ed.: T.A. Pruskova.

PURPOSE: This book is intended for chemical and electrical engineers, physicists, metallurgists and researchers interested in various aspects of electrochemistry.

COVERAGE: The book contains 127 of the 138 reports presented at the Fourth Conference on Electrochemistry sponsored by the Department of Chemical Sciences and the Institute of Physical Chemistry, Academy of Sciences, USSR. The collection pertains to different branches of electrochemical kinetics, double layer theories and galvanic processes in metal electrodeposition and industrial electrolysis. Abridged discussions are given at the end of each division. The majority of reports not included here have been published in periodical literature. No personalities are mentioned. References are given at the end of most of the articles.

Burshtein, R. Kh. (Institute of Electrochemistry, Academy of Sciences, USSR). Investigating the Passivation of Metals by the Oxygen Method of Measuring the Contact Potential Difference and Electrochemical Methods   603

Mirolyubov, Ye. N., M.D. Tomashov, and L.P. Zhuk, Institute of Physical Chemistry, Academy of Sciences, USSR). Passivity of Iron in Oxidizing Solutions   609

Reshetnikov, S.S. (Kazanskiy filial AN SSR-Kazan Branch, Academy of Sciences, USSR). Some Regularities of the Anodic Dissolution of Metals Under Conditions of Local Passivation   617

Sukhotin, A.M. (Gosudarstvennyy institut prikladnoy khimii-State Institute of Applied Chemistry). Passivity of Iron in Acid Solutions   621

Bonovkov, I.V. Anodic Passivation of Copper and Some of Its

Card 24/34

Effect of temperature on the rate of electrochemical evolution of chlorine. S. V. Gorbachev and N. P. Zhuk (Mendeleev Chem. Technol. Inst., Moscow). *Zhur. Fiz. Khim.* **25**, 841–51(1951).—In order to clarify the mechanism of Cl overvoltage (Chang and Wick, *C.A.* **29**, 6020⁴), polarization curves were measured at 25, 50, 70, and 90°, at a Pt–10% Rh needle anode. The reference was a Cl equil. electrode in the same soln. and at the same temp. as the polarized anode. The investigated solns. were: (1) neutral aq. NaCl solns. with m (molality) = 0.1, 0.5, 1, 3, and 5; (2) the aq. solns.: 5 m NaCl + 0.1 m NaOH; 5 m NaCl + 0.25 m NaOH; 5 m NaCl + 0.05 m NaOH + 0.03 m NaClO; (3) 5 m NaCl + 0.1 m HCl; 5 m NaCl + 5 m HCl. Important polarization was observed in neutral and basic solns. The c.d.-voltage curves show two regions. In the first Cl was evolved on a non-passivated soluble anode with little polarization. In the 2nd, stronger polarization accompanied Cl evolution on a passivated anode. Passivation was favored by low c.d., high temp., large Cl⁻ concn., and above all H ions. The absence of a 3rd region showed that no important O evolution took place. The effect of NaCl concn. was important and could not be reconciled with the slow discharge. The relation between c.d. and a_{Cl^-} (a = activity) was complex; it was linear ($I = ka_{Cl^-}$) only at small polarizations ($\Delta E = 0.1$ to 0.3 v.). From the temp. variation of h, activation energies A were found which indicated a chem. process (6050, 8100, and 8850 cal.). The addn. of other ions (in solns. 2 and 3) increased the polarization. In all systems the Tafel equation was not obeyed; at high c.d. the curves ΔE vs. I became steeper. Linearity was observed only at low c.d. Thus, the mechanism of the electrode process must have been complex and changing with the potential. The temp. coeff. of ΔE increased with c.d. and decreased for increasing NaCl concn. and temp. Plots of log I against $1/T$ gave straight lines from the slope φ of which the activation energy was found; $A = -2.3 R \log \varphi$. The limiting values of A were 11,000 (in 5 m NaCl + 0.25 m NaOH at $\Delta E = 0.06$–0.1 v.) and 3000 cal. (in 0.1 m NaCl at $\Delta E = 3$–3.8 v.). The curves $A = f\Delta E$ at different NaCl concn. had 3 smoothly joined regions. At small ΔE, A was practically const. At higher ΔE, A fell down to values (< 5000 cal.) corresponding to concn. polarization in 0.1, 0.5, and 1 m solns. In 3 and 5 m solns., A dropped down to values around 6000–7000 cal. After this fall, A stayed approx. const. for larger ΔE. Thus, a relation like $A = A_0 - a F\Delta E$ (where A_0 is the activation energy when $\Delta E = 0$, a = const., F = Faraday) did not hold true at all values. ΔE and A_0 had a hypothetical meaning. In neutral solns., the max. values of a were 0.7, 0.6, 0.7, 0.4, 0.2 in 0.1, 0.5, 1, 3, and 5 m solns. The decrease of a with increasing m showed a change in the mechanism of the electrode process. A general picture can be sketched as follows. At small ΔE and concn., the usual discharge of Cl⁻ took place. When the NaCl concn. increased, this process was gradually replaced by the discharge of Cl⁻ on a layer of adsorbed Cl atoms. When ΔE became larger, the latter process took over entirely if the NaCl concn. was large enough. Otherwise, concn. polarization became operative. *Michel Boudart*

Chem-Tech. Inst. im. Mendeleyev, Moscow

KIRKIN, G.M.; ZHUK, N.P.

Effect of alloying with aluminum on the corrosion resistance of titanium in sulfuric acid solutions. Zashch.met. 1 no.4:380-384 Jl-Ag '65.

(MIRA 18:8)

ZHUK, N.P.

Graphic method of calculating the temperature dependence of the
pressure of dissociation of metallic oxides. Izv.... 8 no.8:442-
444 Jl-Ag '65.   (MIRA 18:8)

1. Moskovskiy institut stali i splavov.

L 3592-66   EWT(m)/EPF(c)/EWA(d)/EWP(t)/EWP(z)/EWP(b)   MJW/JD/JB
ACCESSION NR: AP5022655   UR/0365/65/001/005/0490/0493
                                                         669.14.018.45
                                                         620.193.5

AUTHOR: Grigor'yeva, A. A.; Zhuk, N. P.; Sergeyeva, G. G.

TITLE: Gas corrosion of austenitic-ferritic steels

SOURCE: Zashchita metallov, v. 1, no. 5, 1965, 490-493

TOPIC TAGS: corrosion, gas corrosion, steel, steel gas corrosion, austenitic steel, austenitic ferritic steel, oxidation, steel oxidation, steel oxidation resistance/ OKh21N5MD2T steel, OKh21N6M2T steel, 1Kh21N5T steel, OKh21N5T steel, Kh18N9T steel, Kh18N12M2T steel

ABSTRACT: The oxidation resistance of OKh21N5MD2T, OKh21N6M2T, 1Kh21N5T, and OKh21N5T standard austenitic-ferritic steels with low nickel content has been tested. The tests were done in air at 800—1050C. All four steels were found to have a somewhat lower oxidation resistance than fully austenitic Kh18N9T and Kh18N12M2T steels, in spite of the lower chromium content of the latter. Steels with higher ferrite content have lower oxidation resistance. This may be explained by the nonuniformity in composition and internal stresses of the formed oxide films. Molybdenum has an ad-

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L 3592-66

ACCESSION NR: AP5022655   3

verse effect on austenitic steel resistance, especially at high temperature (1050C);
it undermines the protective properties of oxide films. No qualitative difference
in oxidation behavior between fully austenitic and austenitic-ferritic steel was
observed. Orig. art. has: 2 figures and 3 tables.   [ND]

ASSOCIATION: Moskovskiy institut stali i splavov (Moscow Institute of Steel and
Alloys)

SUBMITTED: 12May65   ENCL: 00   SUB CODE: MM

NO REF SOV: 010   OTHER: 000   ATD PRESS: 4/14

Card 2/2

ZHUK, N. P.

metallurgy &
metallography

Effect of temperature on the rate of reactive diffusion. N. P. Zhuk (Stalin Steel Inst., Moscow). Zhur. Fiz. Khim. 26, 315-18(1952).—A criticism is made of Arkharov's (cf. *Oxidation of Metals at High Temperatures*, 1945) conclusions that the oxidation rate of Fe and some low alloys of Fe increases in the range of stability of wüstite (FeO) phase because the energy barrier for diffusion decreases. The activation energies in the wüstite range are actually larger, and the rate is detd. by both the activation energy and the frequency factor of the Arrhenius equation. In Arkharov's data rate changes are apparent in the vicinity of 2-γ transition and at the Curie point.   A. Dravnieks

③ met

ZHUK, N.P.

USSR/Chemistry - Physical chemistry

Card1/1   Pub. 147 - 25/26

Authors   : Zhuk, N. P.

Title   : Reversible potentials of cathodic corrosion processes of metals with oxygen
              and hydrogen depolarization

Periodical : Zhur. fiz. khim. 28/1, 188-189, Jan 1954

Abstract   : The values of reversible oxygen and hydrogen electrodes in corrosion media
              and their importance in determining the thermodynamic possibilities of
              processes followed by oxygen or hydrogen depolarization are discussed. The
              real partial oxygen and hydrogen pressure in the atmosphere must be taken into
              consideration when calculating the reversible potentials of oxygen and
              hydrogen electrodes in corrosion media which are found in the atmosphere.
              Six references : 5-USSR and 1-English (1931-1952). Tables.

Institution : The I. V. Stalin Steel Institute, Moscow

Submitted   : August 10, 1953

ZHUK., N. P.
USSR/Chemistry

Card 1/1

Authors	:	Zhuk, N. P., and Linchevskiy, B. V.
Title	:	Oxidation of iron and steel at high temperatures
Periodical	:	Zhur. Fiz. Khim, 28, Ed. 3, 440-452, March 1954

Abstract : Applying the method of continuous suspension of species the authors investigated the kinetics of oxidation of electrolytic and Armco-iron, steel 3, DS, 20x3 and U9 in the atmosphere at temperature ranges of 400 - 1100°C. It was established that the temperature-rate of oxidation curve of the investigated materials undergoes changes in the temperature range of 480 - 580°C which is connected with the formation of wuestite in the oxidation layer, in the temperature range of 730 - 770°C which is connected with the magnetic and eutectoid conversions and at temperature of 850 -880°C where an allotropic conversion takes place. Thirty references. Tables, graphs.

Institution : The I. V. Stalin Moscow Steel Institute

Submitted : June 2, 1953

Evaluation B - 80678, 22 Nov 54

ZHUK, N. P.

USSR/ Chemistry – Physical chemistry

Card 1/1   : Pub. 147 - 21/21

Authors   : Zhuk, N. P.

Title   : Thermodynamic constants of hardly-soluble-in-water halides, sulfides, oxides and hydrates of metal oxides. (Letter to editor).

Periodical   : Zhur. fiz. khim. 8, 1523-1527, Aug 1954

Abstract   : The importance of the values of thermodynamic constants of inorganic compounds for thermodynamic calculations connected with the solution of numerous chemical and metallurgical problems is explained. A new method for the determination of isobaric-isothermal potentials of hardly-soluble-in-water electrolytes (halides, sulfides, oxides and hydrates of metal oxides), is described. Eight references: 6-USSR and 2-USA (1942-1952). Tables.

Institution : The I. V. Stalin Steel Institute, Moscow

Submitted   : March 19, 1954

Zhuk, N. P.

USSR/Chemistry - Physical chemistry

Card 1/1   Pub. 147 - 24/27

Authors   : Zhuk, N. P.

Title   : Thermodynamic constants of hardly-soluble-in-water sulfates, carbonates, chromates, bromates, iodates, oxalates and other metal salts.

Periodical : Zhur. fiz. khim. 28/9, 1690-1697, Sep 1954

Abstract   : The application of a method, previously introduced for the determination of isobaric-isothermal potentials in standard entropies, for the determination of hitherto unknown-in-literature thermodynamic constants of hardly-soluble compounds, is recommended. Results obtained by this method, during calculation of thermodynamic constants for chromates, bromates, iodates and other metals salts, are listed. Tables showing standard isobaric potentials and entropies of hardly-soluble-in-water substances are included. Four references: 3-USSR and 1-USA (1952-1954).

Institution : The I. V. Stalin Steel Institute, Moscow

Submitted : April 14, 1954

USSR/ Chemistry - Metallurgy

Card   1/1   Pub. 147 - 25/25

Authors   :   Zhuk, N. P.

Title   :   The protective potential of steel

Periodical   :   Zhur. fiz. khim. 28/10, 1869-1871, Oct 1954

Abstract   :   The theoretical value of the protective potential of steel was evaluated
on the basis of the modern theory of electrochemical corrosion. Formulas
employed in the calculation of the protective potential are included.
Thirteen references: 9-USSR and 4-USA (1939-1954).

Institution :   The I. V. Stalin Steel Institute, Moscow

Submitted   :   June 14, 1954

USSR/Chemistry - Metal corrosion

Card 1/2   :   Pub. 147 - 16/27

Authors   :   Shekhtman, V. Sh.; Vedeneyeva, M. A.; and Zhuk, N. P.

Title   :   The kinetics of intercrystalline corrosion of Cr-Ni stainless steel

Periodical   :   Zhur. fiz. khim. 28/12, 2199-2210, Dec 1954

Abstract   :   Experiments were conducted to determine the kinetics of intercrystal-
line destruction (corrosion) of Cr-Ni stainless steel and to determine
the effect of various factors (composition and concentration of
corrosion medium, titanium content, cold deformation, temperature and
period of annealing, etc.) on the corrosion resistance of the steel.
The presence of Ti in the steel was found to reduce the rate of its
intercrystalline corrosion. A Ti content exceeding that of C eliminates
the intercrystalline corrosion in the steel. Cold deformation prior
to brief annealing (5 - 10 min) at 650° C reduces the intercrystalline
corrosion tendency of the steel. The data regarding the kinetics of
intercrystalline corrosion of the tested steel are given in graphs.

Zhur. fiz. khim. 28/12, 2199-2210, Dec 1954   (Additional Card)

Card 2/2

Abstract   :   Eighteen references ; 10 USSR: 1 English; 1 German and 6 USA
                  (1930-1952). Tables; diagrams; drawings; illustrations.

Institution   :   The I. V. Stalin Steel Institute, Moscow

Submitted   :   April 28, 1954

USSR/Chemistry – Physical chemistry

Card 1/2   :   Pub. ...

Authors   :   ...

Title   :   ...

Periodical   :   Zhur. fiz. khim. 28/12, 2204–2207, Dec 1954

Abstract   :   A new method is introduced for the study of the Fe oxidation mechanism
                     by means of the radioactive Fe59 isotope. The isotope activity distri-

                     ...

                     ...
                     ... (1945-1954). ...

Institution   :   The I. V. Stalin Steel Institute, Moscow

Submitted   :   July 9, 1954

ZHUK, N. P.

"The Application of the Isotope Fe for the Investigation of the Mechanism of Iron Oxidation," in book The Application of Radioisotopes in Metallurgy, Symposium XXXIV; Moscow; State Publishing House for Literature on Ferrous and Nonferrous Metallurgy, 1955.

B. V. Linchevskiy, Engr.; N. P. ZHUK, Assistant/Chair of Metal Corrosion, Moscow Inst. of Steel im I. V. Stalin.

ZHUK,N.P., dotsent, kandidat khimicheskikh nauk

Electricity and chemistry. Znan.sila 30 no.10:17-20 O'55.
(Electrochemistry)   (MIRA 8:12)

MIROLYUBOV, Ye.N., inzhener; ZHUK, N.P., detsent, kandidat khimicheskikh nauk; TOMASHOV, N.D., professer, dokter khinicheskikh nauk.

Investigating the passivity ef iren in oxidizing selutiens. Sber.Inst. stali 34:320-329 '55. (MLRA 9:7)

1.Kafedra kerrezii metallev.
(Iron alleys) (Radieactive isotepes--Industrial applicatiens)

ZHUK, N.P.

Category : USSR/Solid State Physics - Phase transformation of solid bodies   E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1236

Author   : Linchevskiy, B.V., Zhuk, N.P.
Title   : Use of the Fe^{59} Isotope to Investigate the Iron Oxidation Mechanism.

Orig Pub : Primeneniye radioaktivnykh izotopov v metallurgii. M., Metallurgizdat, 1955,
           sb. 34, 341-346

Abstract : A study was made of the distribution of radioactive iron over the layers
           of scale. Two activity maxima were noted: one in the internal and the
           other in the external layers of the scale. The minimum of the activity is
           located in the center of the scale. A diagram is included, showing the
           distribution of the concentration of the activity and the relative activity
           over the thickness of the scale. A scheme explaining the resultant experi-
           mental data is proposed for the oxidation process. The data obtained con-
           firm also the presence of a two-way diffusion of iron and of oxygen in
           both directions through the scale layer. Further ways of using tracer atoms
           are proposed for the study of the oxidation process in iron and in iron
           alloys.

Card   : 1/1

PHASE I BOOK EXPLOITATION   602

Zhuk, Nikolay Platonovich

Korroziya i zashchita metallov; raschety (Corrosion and Protection of Metals;
    Calculations) Moscow, Mashgiz, 1957. 7,000 copies printed.

Reviewer: Akol'zin, P.A., Candidate of Technical Sciences; Ed.: Slomyanskaya,
    F.B., Candidate of Technical Sciences; Ed. of Publishing House: Tairova, A.L.;
    Tech. Ed.: Matveyeva, Ye.N.; Managing Ed. for literature on machine building
    and instrument construction (Mashgiz): Pokrovskiy, N.V., Engineer.

PURPOSE: This book is intended for scientists, engineers, and technicians work-
    ing in the field of corrosion and protection of metals.

COVERAGE: The book explains basic analytical and graphical methods of making
    corrosion calculations. The calculations, which have to do mainly with the
    kinetics of corrosion processes, incorporate the most important facts of what
    is known about the corrosion and protection of metals. Tables of data for
    making the calculations appear at the end of the book. The author expresses
    his thanks for suggestions and assistance rendered by N.D. Tomashov, Professor,

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Corrosion and Protection of Metals; Calculations   602

Doctor of Chemical Sciences; P.A. Akol'zin, Candidate of Technical Sciences;
F.B. Slomyanskaya, Candidate of Technical Sciences; and M. Kh. Karapet'yants,
Candidate of Chemical Sciences. There are 162 references, of which 126 are
Soviet, 28 English, 6 German, and 2 French.

TABLE OF CONTENTS:

Card 2/11

AUTHOR: Zhuk, N. P.   76-10-30/34

TITLE: A Graphic Calculation of Cathodic Protection with the Aid of Direct Current from an External Source (Graficheskiy raschet katodnoy zashchity pri pomoshchi vneshnego istochnika postoyannogo toka).

ABSTRACT: A graphic calculations of a complete cathodic protection of metallic construction without an insulating protective cover is given. The metal construction to be protected and subjected to a corrosion in the electrolyte is here assumed to be a binary (two electrodes) galvanic element. On the strength of the ideal curve of the cathodic polarization of the cathode range or of the real cathode polarization of the given system the amperage $I_{protection}$ can be found as abscissa of the intersection point of one of these curves with the horizontal drawn through the ordinate $V = V_{protection} = V_a^o$. This value $I_{protection}$ is the

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A Graphic Calculation of Cathodic Protection with the   76-10-30/34
Aid of Direct Current from an External Source

first parameter of the direct current source. For the
calculation of the second parameter of the direct
current source, of the voltage E, all Ohm resistances within
the current circuit of the cathodic protection and the
curve of the anode polarization of the projected auxiliary
anode must be known. To the obtained value of the direct
current source voltage the product of protective current
times Ohm's resistance of the junction lines is to be
added. Analogously the calculation is given for the case
if an insulating cover exists. There are 2 figures and 5
Slavic references.

ASSOCIATION: Institute for Steel imeni I. V. Stalin, Moscow (Moskovskiy
                institut stali im. I. V. Stalina).

SUBMITTED: July 26, 1956

AVAILABLE: Library of Congress

CARD   2/2

AUTHOR: Zhuk, N. P.   SOV/163-58-3-2o/49

TITLE: Gas Corrosion of Steels (Gazovaya korroziya stali)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958,
            Nr 3, pp 115 - 119 (USSR)

ABSTRACT: In general the layer formed in the gas corrosion has
           certain protective properties which prevent a further
           corrosion, i.e. a further oxidation of the metals.
           The results obtained in the determination of the rate
           of oxidation in iron and various steels as well as in
           steel КЛ5N4Ц9 demonstrate that the kinetics of the
           oxidation process of carbon containing and low alloyed
           steels may be expressed by the following equation:

$$\Delta g^n = K_n \tau \qquad (2)$$

           n has a constant value for certain temperatures and does
           not change with the temperature. In figure 2 the influence
           of the temperature on the mean value of the index of
           the parabolic dependence in the case of an oxidation in the
Card 1/2   air is shown. The temperature dependence of the mean

Gas Corrosion of Steels

SOV/163-58-3-2o/49

oxidation rate of steel in the air was investigated. The temperature dependence of the rate of oxidation is expressed by the function

$\lg K_{weight} = f(\frac{1}{T})$. The curve is composed of sections of straight lines of different inclination. The resistance to temperature of steels with different carbon content is different. The activation energy of the oxidation process of carbon containing steels differs between 5 and 8 kcal/mol (mean value = 29 kcal/mol). The resistance to temperature of the steel samples alloyed with copper is greater that that of iron alloys not containing copper. A marked resistance to temperature was found at 0,85% copper. There are 4 figures and 12 references, 11 of which are Soviet.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute)

SUBMITTED: December 4, 1957
Card 2/2

18(3)
AUTHOR: Zhuk, N. P.   SO7/163-58-4-12/47

TITLE: Iron Corrosion in Not Intermixed Neutral Solutions (Korroziya
               zheleza v neperemeshivayemykh neytral'nykh rastvorakh)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1958, Nr 4,
               pp 71 - 78 (USSR)

ABSTRACT: The corrosion of iron, zinc and some other metals with an
               oxygen depolarization in not intermixed neutral electrolytes
               is considered in the theory (Refs 1 - 4) as a case of a pre-
               dominant cathode control of the process at a prevalent modera-
               tion at the expense of oxygen diffusion. To prove the correct-
               ness of this thesis it is necessary to have, apart from the
               calculation of the degree of control, also some data on the
               mutual relation between the resistances of the ionization
               stage and of the stage of oxygen corrosion of corresponding
               metals. Determination of these resistances is connected with
               the difficulty of obtaining the ideal polarization curves
               required for this purpose. These resistances can, however,
               be determined according to the real cathode polarization
               curves. Formula (3) permits to calculate the relation of
Card 1/4   these resistances according to formula (1). From the real

Iron Corrosion in Not Intermixed Neutral
Solutions   SOV/163-58-4-12/47

cathode polarization curves obtained for a not intermixed
neutral 1% NaCl solution and the corresponding calculation it
results that Fe, Cu and Zn have a cathode control, but a
mixed diffusion-kinetic control. Here, for Fe a distinct,
for Cu a strongly prevalent moderation at the expense of the
oxygen ionization. There is a mixed cathode-anode control for
Al, and here we observe a strong prevailing of moderation at
the expense of the oxygen diffusion in the cathode process.
It is shown that in not intermixed electrolytes the extreme
diffusion current density at the real polarization curves i_s

must be different for different cathodes, and is distinguished
from i_D (real extreme diffusion current density) by the value

of the cathode self-dissolution current density. Here self-
dissolution of the aluminium cathode occurs with a mixed cathode-
anode control, whereas the cathode process on Pt, which
interacts in a pair with Zn, takes place according to a
mixed oxygen-hydrogen depolarization. - Experiments made in
common with B. K. Opara confirmed the conclusion of a mixed
diffusion-kinetic control of the iron corrosion in not inter-

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Iron Corrosion in Not Intermixed Neutral
Solutions

SOV/163-58-4-12/47

mixed NaCl solutions.- The conclusions drawn show a deficiency, namely the disregard of time. The experiments have shown that an increase in adsorptivity of the cations normally facilitates the course of the cathode process of iron corrosion, while an increase in adsorptivity of the anions impedes this course. This is due to the influence of the ions on the cathode reaction of the oxygen ionization, and to the change in the concentration of oxygen on the surface of the metal. Experiments show that the speed of iron-corrosion is directly proportional to the frequency in which the corrosion products are being removed. In case of three removals of the corrosion products within 24 hours, the corrosion increases within 200 hours about 1.4 times faster (as compared with the speed of corrosion in samples without removing the corrosion products). There are 4 figures, 3 tables, and 11 references, 10 of which are Soviet.

ASSOCIATED: Moskovskiy institut stali (Moscow Steel Institute)

Card 3/4

5(4)

AUTHOR: Zhuk, N. P.

SOV/76-32-12-15/32

TITLE: The pH Value Determined by Low Solubility Metal Corrosion Products (Znacheniya pH, ustanavlivayemyye trud-norastvorimymi produktami korrozii metallov)

ABSTRACT: In the corrosion of metals the products of the primary (anodic or cathodic) reaction react with each other as well as with the electrolyte and the gases dissolved therein. This results in the formation of difficultly soluble secundary corrosion products. In unbuffered salt solutions the concentration of the H- and OH- ions changes, which means that the pH value is changing. Experiments were carried out with alumi-num, cadmium, copper, iron, magnesium, manganese, nickel, lead, tin, and zinc. In the first series of tests the initial pH values were set to 5, 7, and 9, in the second series to 4, 7, and 10 by adding NaOH or H_2SO_4. Each series took 250 hours at room temperature. The final pH value

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The pH Value Determined by Low Solubility Metal
Corrosion Products   SOV/76-32-12-15/32

was reached the sooner, the closer the interval between
the initial values was, and the faster the corrosion of
the metal took place. The final pH values to be expected
were calculated from the solubility products. With the
exception of nickel the measured pH values agreed with
the calculated results. There are 2 figures, 2 tables,
and 14 references, 11 of which are Soviet.

ASSOCIATION: Moskovskiy institut stali im. I. V. Stalina (Moscow Steel
               Institute imeni I. V. Stalin)

SUBMITTED: February 14, 1957

Card 2/2

AUTHORS: Tomashov, N. D., Zhuk, N. P., Kernich, N. K.

TITLE: Corrosion Pitting of Stainless Steel (Tochechnaya korroziya nerzhaveyushchey stali)

PERIODICAL: Sb. Mosk. in-t stali, 1958, Vol 38, pp 584-602

ABSTRACT: The tendency of 1Kh18N9T steel towards pitting (P) and the effect of various factors on this type of corrosion were investigated by the method of determination of the piercing potential. It is shown that among the Cl^-, Br^-, F^-, I^- and SO_4^{2-} anions the greatest amount of P is caused by Cl^- and the least by I^-. By means of experiments with aqueous solutions of NaCl of various concentrations (from 0.001 to 5N) it was found that the relationship between the piercing potential of 1Kh18N9T steel and the activity of Cl^- in the solution has a logarithmic character. The character of Na^+, K^+, Ga^{2+}, Mg^{2+}, and Ba^{2+} cations has little effect on the tendency of steel towards P. The effect of the pH value of the medium (0.5N solution of NaCl with additions of HCl or NaOH) varies. The effect of the temperature was investigated in the 3-90°C range. The resistance of

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Corrosion Pitting of Stainless Steel   SOV/137-58-11-23048

1Kh18N9T steel to P decreases with the rise in temperature in connection with the increasing rate of the action of Cl^- on the protective oxide film and the decreasing contents of the passivator (O_2) in the solution. The determination of the piercing potential of Cr-Ni steel of six industrial grades showed that Kh18N12M2T steel (2.8% Mo) possesses the greatest resistance to P. Introduction of Nb (Kh18N9M2B steel) lowers its resistance appreciably. An increase in the amount of Ti and C in steel produces similar results. The introduction of Mn into Cr-Ni steel with a simultaneous decrease of its Ni contents reduces greatly the resistance of the steel to P. An increase in Cr content (from 0.2 to 41.5%) increases P resistance. The results of 15 days' comparative corrosion tests by full or intermittent immersion of Cr and Cr-Ni steels in solutions of 0.5N $FeCl_3$ and 0.49N NaCl + 0.01N HCl agree fully with the data obtained by the method of determination of piercing potential. Bibliography: 17 references.

P. S.

Card 2/2

Zhuk, N.P.

24(7); 25(1)   PHASE I BOOK EXPLOITATION   SOV/3133

Voprosy i zashchita stali; sbornik statey (Corrosion and Protection of Steel: Collection of Articles) Moscow, Metallurgizdat, 1959. 233 p. 7,000 copies printed.

Ed.: N.D. Tomashov, Doctor of Chemical Sciences, Professor; Reviewers: A.L. Zhukhovitskiy, Doctor of Chemical Sciences, Professor; and Ed. of Publishing House; Ya.G. Lisovskiy, Tech. Ed.; N.P. Pogrebova, Docent; Managing Ed. for Literature on Machine and Instrument Construction: N.V. Pokrovskiy, Engineer.

PURPOSE: This book is intended for scientific and technical personnel concerned with questions of the corrosion and protection of metals.

COVERAGE: The articles in this collection deal with the corrosion of steels in corrosive environments, investigation of the effect of various factors on corrosion, and methods of protecting steels from gas and electrochemical corrosion. Special attention is given to new methods of investigation. A number of the articles give the results of studies made under operating conditions. New data, obtained by the Department of Metal Corrosion,

Moscow Institute of Steel, are published here for the first time. Four articles are the result of work conducted jointly at the laboratories of the Kokhovskiy metallurgicheskiy zavod "Sorp i molot" (Moscow Metallurgical Plant "Serp i molot"), and the Rkedskovskiy zavod imeni N.I. Kalinina (Chemical Plant imeni N.I. Kalinin). Most of the articles contain practical recommendations on the protection of metals from corrosion. No personalities are mentioned. References follow each article.

Card 1

ZHUK, N. P.

TOMASHOV, Nikon Danilovich. Prinimali uchastiye: TYUKINA, M.N.; PALEOLOG,
Ye.N.; CHERNOVA, G.P.; MIKHAYLOVSKIY, Yu.N.; LUNEV, A.P.; TIMO-
NOVA, M.A.; MODESTOVA, V.N.; MATVEYEVA, T.V.; BYALOBZHESKIY, A.V.;
ZHUK, N.P.; SHREYDER, A.V.; TITOV, V.A.; VEDENEYEVA, M.A.; LOKO-
TILOV, A.A.; BERUKSHTIS, G.K.; DERYAGINA, O.G.; FEDOTOVA, A.Z.;
FOKIN, M.N.; MIROLYUBOV, Ye.N.; ISAYEV, N.I.; AL'TOVSKIY, R.M.;
SHCHIGOLEV, P.V.. YEGOROV, N.G., red.izd-va; KUZ'MIN, I.F.,
tekhn.red.

[Theory of the corrosion and the protection of metals] Teoriia
korrozii i zashchity metallov. Moskva, Izd-vo Akad.nauk SSSR,
1959. 591 p.   (MIRA 13:1)
            (Corrosion and anticorrosives)

KLINOV, Iosif Yakovlevich; ZHUK, N.P., kand.khim.nauk, red.; TAIROVA,
A.L., red.izd-va; TIKHANOV, A.Ya., tekhn.red.

[Corrosion of chemical apparatus and corrosion-resistant
materials] Korroziia khimicheskoi apparatury i korrozionno-
stoikie materialy. Izd.3., perer. i dop. Moskva, Gos.nauchno-
tekhn.izd-vo mashinostroit.lit-ry, 1960. 511 p.   (MIRA 13:9)
        (Chemical apparatus--Corrosion)
        (Corrosion-resistant materials)

TOMASHOV, N.D., doktor khimicheskikh nauk; ZHUK, N.P., kand.khimicheskikh
    nauk; MIROLYUBOV, Ye.N., kand.khimicheskikh nauk

Behavior of iron and steel in oxidizing solutions. Sbor.
Inst.stali no.39:438-449 '60.   (MIRA 13:7)

1. Kafedra korrozii metallov Moskovskogo ordena Trudovogo
Krasnogo Znameni instituta stali im. I.V.Stalina.
        (Iron--Corrosion) (Steel--Corrosion)
                (Oxidizing agents)

18.1151

AUTHORS: Abramov, O.V., Zhuk, N. P.

TITLE: Oxidation of some alloys in the conditions of heat-treatment in gas and electric furnaces

TEXT: The oxidation of a number of heat-stable alloys, based on Fe and Ni, has been studied at temperatures of 900 - 1200°C: ЭИ 435 (EI 435), ЭИ 652 (EI 652), ЭИ 559 (EI 559), ВЖ 98 (VZh 98), ЭИ 894 (EI 894), ЭИ 703 (EI 703), ЭИ 813 (EI 813), and ЭИ 835 (EI 835). The process was carried out in the products of combustion of town gas with α (coefficient of excess air) = 0.8 - 1.5 and in air. It is shown that the oxidation of the alloys EI 435, EI 652, EI 559 and EI 835 follows the expression $\Delta g = k_3 \log \tau + k_4$ while the other alloys follow the expression $\Delta g^n = k_2 \tau$ where n is nearly 2. Increasing of the oxidizing ability of the atmosphere has a different

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Oxidation of some alloys ...

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B151/B101

influence on the rates of oxidation for the different alloys. The heat-resistance increases (with increase in the oxidizing ability of the atmosphere) with those alloys which contain Al (EI 652, EI 559). On introducing Mo and Nb into EI 602 the heat stability of the alloy decreases. It is noted that the increase in the oxidizing ability of the atmosphere lowers the rate of oxidation of the alloys especially at high temperatures. It is recommended that the heat treatment of the alloys EI 652, EI 559, EI 894, and EI 602 be carried out in electric furnaces in a strongly oxidizing air atmosphere while that of alloys EI 703, EI 813, EI 835 be carried out in the products of gas combustion with $\alpha \approx 0.8$. The possibility of the substitution, in weakly oxidizing atmospheres ($\alpha = 0.8 - 1.0$) and temperatures below 1000 - 1050°C, of alloys EI 435, EI 652, EI 894, EI 602 by alloys EI 703, EI 813, EI 835 is noted. [Abstracter's note: Complete translation.]

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B151/B101

18. 4/o

AUTHORS: Zhuk, N. P., Yemel'yanenko, L. P.

TITLE: The effect of carbon content on the gas corrosion of
             carbon steels in air

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 1, 1962, 306,
             abstract 1I183 (Sb. "Korroziya i zashchita konstrukts.
             metallich. materialov". M., Mashgiz, 1961, 40-52)

TEXT: A study of the effect of the carbon content on the gas corrosion
of carbon steels (oxidation and decarbonization) in air is described,
using periodic weighing without removing the sample from the furnace, at
temperatures from 500 - 1000°C. At high temperatures (850 - 1100°C) the
rate of oxidation of carbon steels decreases with increasing C content.
At temperatures from 700 - 800°C the oxidation process is complex, showing
varying rates of oxidation. In the temperature region 500 - 650°C the C
shows an insignificant effect on the rate of oxidation of carbon steels.
The scale growth in all the steels, at the temperatures studied, follows

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The effect of carbon ...

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the law $\Delta g^n = k\tau$. The rate of oxidation of the steels decreases with increasing C content. This effect increases with increasing temperature. [Abstracter's note: Complete translation.]

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B168/B101

AUTHORS: Kuznetsov, G. G., Zhuk, N. P., Lyubinskiy, B. E.

TITLE: Electrolytic pickling of high alloys

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 1, 1962, 343, abstract
              1K129 (Sb. "Korroziya i zashchita konstrukts. metallich.
              materialov", M., Mashgiz, 1961, 53-71)

TEXT: Electrolytic pickling - anodic, cathodic, a.c. and a.c. with
bipolar connection of specimens - was studied with a view to removing
the cinder from alloy ЭИ435 (EI435) in solutions of H_2SO_4. The
influence of H_2SO_4 concentration, of electrolyte temperature and of D on
the rate of this process, on the weight losses of the metal and on the
surface quality of the samples after corrosion was also studied.
[Abstracter's note: Complete translation.]

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S/137/62/000/004/144/201
A060/A101

AUTHORS: Kuznetsov, G. G., Zhuk, N. P., Lyubinskiy, B. E.

TITLE: Electrolytic etching of high-alloy alloys

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 4, 1962, 104, abstract 4I635 (V sb. "Korroziya i zashchita konstrukts. metallich. materialov". Moscow, Mashgiz, 1961, 53 - 71)

TEXT: An investigation was carried out upon the electrolytic etching of steel X18H12M2T (Kh18N12M2T) and alloy ЭИ 435 (EI435) in solutions of H_2SO_4 (anodic, cathodic, alternating current, alternating current with bipolar connection of the specimens) and the effect of the H_2SO_4 concentration, the electrolyte temperature, and D upon the rate of this process, weight losses of the metal, and the quality of the specimen surface after etching. The polarization curves measured upon specimens of Kh18N12M2T and EI435 both with and without scale indicate that the scale etching is under anodic control in H_2SO_4 solutions. The scale of Kh18N12M2T under electrolysis is removed by the etching action upon the base metal under the scale by anodic polarization, which is further helped by

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the mechanical action of the gaseous O_2 given off. The etching action of the base metal at low values of D_A occurs as result of its slow dissolution in the passive state. For both alloys the anodic etching of the scale is most effective. The etching schedule is cited. The etching of the scale by alternating current is a longer process than anodic etching. Scale etching by alternating current yields results similar to those under ordinary etching with AC, but the rate of the process is lower. All the recommended methods of electrolytic etching of the scale on both alloys investigated are considerably more effective than ordinary dissolution of the scale in H_2SO_4 solutions; they accelerate the process of removing the scale, reduce the weight losses of the metal under etching, and raise the quality of the surface after etching. There are 11 references.

V. Tarisova

[Abstracter's note: Complete translation]

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S/137/61/000/011/108/123
A060/A101

AUTHORS: Markovich, L. A., Zhuk, N. P.

TITLE: Effect of halogen ions upon the corrosion behavior of steel 1 X 18H9T (1Kh18N9T) in the course of sulfuric acid pickling

PERIODICAL: Referativnyy zhurnal. Metallurgiya, no. 11, 1961, 56, abstract 11I366 (V sb.: "Korroziya i zashchita konstrukts. metallich. materialov", Moscow, Mashgiz, 1961, 93 - 107)

TEXT: An investigation was carried out upon the effect of halogen ions upon the corrosion and electrochemical behavior of 1Kh18N9T steel in 18% H_2SO_4. The addition of NaCl to 18% H_2SO_4 at 70°C accelerates the scale elimination by a factor of 1.5, reduces the corrosion losses of the steel by a factor of 6 - 10, and improves the surface quality of the pickled metal. An increase in the NaCl concentration in 18% H_2SO_4 up to 5 g/liter lowers the dissolution rate of steel 1Kh18N9T; in the NaCl concentration range from 7 to 70 g/liter the corrosion rate is constant, and further increase in the NaCl concentration accelerates the steel dissolution. The optimum NaCl concentration is 5 - 10 g/liter. The data on the dependence of the corrosion rate of steel 1Kh18N9T in 18% H_2SO_4 upon the

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